

WT Docket No. 04-356
WT Docket No. 02-353

To: Office of the Secretary
Federal Communications Commission
Washington, DC 20554

Comment Filed by: Canyon Area Residents for the Environment (CARE)
25958 Genesee Trail Road, PMB 203, Golden, CO 80401-5700
www.c-a-r-e.org

Attorney: Deborah Carney
21789 Cabrini Boulevard
Golden CO 80401
Tel: (303) 526-9666
e-mail: deb@carneylaw.net

November 22, 2004

The following comment is submitted by Canyon Area Residents for the Environment (CARE) in response to the FCC's request for comment relating to the tentative conclusion set forth in the "RF Safety" section of the Notice of Proposed Rule Making adopted September 9, 2004 in Docket Nos. 04-356 and 02-353 (paragraph 114). CARE is a coalition of homeowners' associations & neighborhoods in the Mount Vernon Canyon. Since 1987, CARE has served as an umbrella organization representing the 9,000 people in the central mountain communities of Jefferson County - from Clear Creek to Bear Creek, the Hogback to Rainbow Hills.

The "RF Safety" section of the Notice of Proposed Rule Making adopted September 9, 2004 in Docket Nos. 04-356 and 02-353 (paragraph 114) sets a threshold for environmental review of 1000 watts of effective radiated power ("ERP") and asserts that this will prevent human exposure to potentially unsafe levels of radio frequency ("RF") radiation in compliance with the National Environmental Policy Act (NEPA). This assertion is not true.

UNLIMITED ADDITION OF ANTENNAS UNDER 1000 WATTS EASILY

EXCEEDS 1000 WATTS. The FCC proposal is critically flawed because it allows the unlimited addition of antennas under 1000 watts with no NEPA compliance. Simple math shows how multiple antennas under 1000 watts can add up. The CARE area includes Lookout Mountain. Over 1500 RF producing devices are registered with the FCC. Most of these devices are under 1000 watts ERP and a few are the high power TV and FM antennas. It took repeated private citizen RF measurements to have the FCC come out to measure RF on Lookout Mountain. Lookout Mountain has been found to be over the FCC RF limits. The Colorado Department of Health has confirmed statistically significant elevations in brain tumors on Lookout Mountain.

THE FCC APPROACH TO RF SAFETY STANDARDS DEVELOPMENT SHOULD BE BASED ON BIOLOGY RATHER THAN PHYSICS

Human beings are biological organisms, not inert material. CARE opposes the FCC's adoption of the proposed rules as inappropriate, superficial and arbitrary and urges the FCC to initiate thorough and comprehensive research and study of the rule's impact on human health using a biological approach rather than the physics approach put forth by the Institute of Electrical and Electronics Engineer's (IEEE) International Committee on Electromagnetic Safety (ICES) upon whose RF human safety standards development FCC now relies. ICES's approach to RF safety policy recognizes thermal harm due to tissue heating as the only established mechanism of biological harm.

The present FCC radiation limits are designed to protect only against short-term adverse health effects caused by heating of the body. They are not designed to protect people from long-term exposure to thermal effects of RF, nor are they designed to protect people from

exposure -- of any duration -- to non-thermal effects of RF. Norbert N. Hankin, EPA, Center for Science and Risk Assessment, Radiation Protection Division, and also Chairman of the federal Radiofrequency Interagency Work Group (RFIAWG) stated:

The FCC's current exposure guidelines, as well as those of the Institute of Electrical and Electronics Engineers (IEEE) and the International Commission on Non-ionizing Radiation Protection, are thermally based, and do not apply to chronic, nonthermal exposure situations The FCC's exposure guideline is considered protective of effects arising from a thermal mechanism but not from all possible mechanisms. Therefore, the generalization by many that the guidelines protect human beings from harm by any or all mechanisms is not justified. ...

Federal health and safety agencies have not yet developed policies concerning possible risk from long-term, nonthermal exposures.

Richard Hoffman, M.D., the 1999 Chief Medical Officer for the Colorado Department of Public Health and Environment (CDPHE) and also the State Epidemiologist, testified at the request of the Jefferson County Commissioners as an independent expert on health risk from long-term broadcast radiation, testified that the FCC radiation standard is not based on the long term effects that would be experienced by this neighborhood, is not the kind of standard the CDHE uses for cancer protection, and is based only on acute (short term) effects.

...There's a lot of difference in those kinds of standards. (Short term vs. long term). If you take two aspirin, that would be safe. If you take 100 aspirin at one time, you should be in the emergency department fighting for your life. If you take two aspirin every once in a while, it won't cause any harm. If you take two aspirin every day for months and months and years, it may cause bleeding in your stomach. So the degree of exposure, and the length of exposure, is very important in Epidemiology in terms of drawing conclusions. Lake Cedar Group v Jefferson County.

PHYSICIANS AND SCIENTISTS TAKE ISSUE WITH THE RF STANDARDS IN LEGAL PROCEEDINGS

Ongoing legal disputes arising from industry attempts to add more antennas on Lookout Mountain has led to numerous lawsuits. Significant sworn testimony and relevant exhibits are contained in the record on these lawsuits. The current suit, **City of Golden et al v Jefferson County Commissioners, et al.** Jefferson County Colorado District Court case number 03CV3045 contains significant relevant evidence that is summarized below.

On March 3, 1999, numerous physicians at the University of Colorado Health Sciences Dept. of Radiation Oncology sent the following letter to Jefferson County regarding increasing the RF levels on Lookout Mountain.

We know of no other instance where a device, chemical or drug ...would be imposed on the public without proof of its safety.... Without proper scientific data, we consider it unconscionable to expose the people of Jefferson County to these levels of radiation.

A significant number of physicians and scientists testified under oath during the summer of 2004 about the defects of the FCC's RF human exposure guidelines. This testimony has been transcribed and is available. **A synopsis follows** with reference to the Record number in the Jefferson County District Court record on this case. Eighteen MD's opposed the addition of more RF on Lookout Mountain by either testifying against the Lake Cedar Group broadcaster's proposal or sending in letters in opposition on the basis of health risks.

Dr. Ross Wilkins, orthopedic oncologist.

*Adding more radiation puts the population of Lookout Mountain and that area under an experimental status saying, " well let's put the towers up and see what happens." Well it's just ridiculous and it should not be done. **R 11659- R 2059, 4989, 11659** Defect that we see in all cancer has to do with DNA damage and it's been shown unequivocally in the hundreds, hundreds of studies that the same radiation that comes of those towers causes DNA damage. And when DNA is damaged you can lose control of cell growth and that this causes cancer and that is a scientific fact. And for someone to sit there and say don't worry about it. This has no effect. It's absolutely ludicrous. **R 11663***

Dr Goldsmith-epidemiologist.

Why did the Russians irradiate the U.S. embassy could be answered because they wanted to produce this interference with the ability to concentrate, the ability to sleep, the ability to think which was, which were aspects of the radiofrequency sickness syndrome which they defined previously under experimental conditions. Well we no longer can act as though non- ionizing radiation is innocent and we no longer can act as though there is a lack of thermal effects. R 11660-1 and Exhibit 112

Dr. Ted Litovitz. Physicist at Catholic University BioElectricomagnetics Laboratory.

(More detailed discussion of research is covered later in CARE's comments.)

The standards that protect you today are based upon the heating of the tissue. That's your total protection. If there's any effect out there that can cause a biologic effect on your tissue that doesn't heat it that isn't levels well below the energy necessary to raise the temperature several degrees you have no protection by law. Many papers have been reported in which they've seen non-thermal effects below. That show's psychological changes at .03. That's much less, effects on immune system, effect on calcium efflux, the cell, induction of DNA damage. The first was 50 times less than the standard, the second one's a 100 times less than the standard, the third 300 etc. It is so obvious that you can get biologic effects at levels 75,000 times lower than the standards. Not replicated

Does replication problems occur only in bioeletromagnetic effect? No. After exposure to Drug X-rats born normal and deformed. Sixty percent of them are deformed. But somebody else does an experiment. They're not deformed. It's a lack of replication. So what do you do? If something is not replicated the answer is the people who got an effect are incompetent. The drug was called thalidomide and 10,000 kids who were deformed wished that the replication issue had been studied more carefully. R 11662-3.

Dr. Frankel (Harvard MD, Triple Board certified) with a PowerPoint
R 4723, 4952-7, 5583, 6100-7, 11711.

Resume R 4952-57

PowerPoint R 5583-90

Testimony

R 11711-Frankel-Effect of low dose RF radiation on human health and disease. My MD from Harvard Medical School. I'm board certified in internal, medicine, pulmonary medicine and critical care medicine. Assistant Professor of Medicine at both National Jewish and University of Colorado Health Science Center. Physician scientist in cell biology and cell signal transaction.

R 11712-Frankel-All the studies I am going to discuss all appeared in respected scientific and medical journals. Questions of public health, prudence and public safety should take priority when making public policy decisions. Absence of data does not equal negative data. In long-term exposures.

R 11713-Frankel- It doesn't only have to be safe for adults, but for babies, infants, children and pregnant women.

Exposure has a biological mechanism-epidemiologic evidence that correlates that exposure with that disease. Actually the single highest standard that medical evidence can be held to. Hundreds of studies over decades to really accumulate that kind of conclusive evidence. Road signs and way stations on the way to a destination where the answer is clear like cigarettes cause cancer.

R 11714-Frankel-Non-thermal effects of RF radiation exist and occurs at levels previously thought to be safe. Thermal effects alone should be considered an acceptable readout of biologic effects in the year 2003. No other bio-medical field considered measuring skin and organ temperature to be a sensitive mechanism assessing biologic effect. Thermal effect-neither validated nor acceptable for assessing long-term low dose exposures. Equivalent of saying that cigarettes can't possibly cause cancer if you don't burn them out while smoking. Low dose RF radiation has been shown to cause everything on this list. DNA damage. DNA damage leads to cancer. Free radicals lead to cell death and DNA damage. Alzheimer's disease to cystic fibrosis to cardiac arrhythmia's. Alterations and cell-proliferation transformation. Those are the changes you see in cells that are becoming cancerous. Proteins.

R 11715-Frankel-The immune system not only protects you from diseases it performs something called tumor surveillance. That's where the immune system looks around the body and eliminates any cell that looks like it might be becoming cancerous. If your immune system gets deregulated it can lead to autoimmune diseases ; rheumatoid arthritis and lupus and allergic diseases such as asthma. Are cell pathways that regulate your most basic cellular functions. Abnormalities in these systems have been implicated in everything from cancer biology to a multitude of other diseases states.

Epidemiological evidence. Adult and childhood leukemia, cancer of the blood, brain cancer, infertility, altered immune function and neurological and developmental impairment. Of the larger epidemiological studies that report a correlation between low dose, essentially residential RF radiation and leukemia. 2002-population living around the Vatican's radio and transmission station and found there to be a 2.2 fold increase in the rate of childhood leukemia and that increase was seen for a rate up to six kilometers from the station.

R 11716

Frankel-The results of this study basically corroborate the findings from other studies from around the world, Australia, Hawaii, Great Britain. You've now replicated the same findings in genetically diverse populations and in otherwise diverse environments. Occupational studies showing increased rates of brain cancer and persons who are occupationally exposed to electric and magnetic fields. Leukemia and brain cancer for utility workers. Brain cancer in Air Force personnel. Meta analysis. 10 to 20% increase in the rate of brain cancer in folks who are occupationally exposed to electric and magnetic fields.

R 11718-Frankel-(commenting on the ongoing CSU Study on the Lookout Mountain residents and Colorado Dept. of Health Brain Cancer Audit)

So basically the study design is to look at 300 people including 75 children and then take careful RF measurements of each subject's individual exposure and then not look only for tumor incidents but actual biomarkers of disease. They're going to measure melatonin levels. They're collecting blood and urine. Suppression of melatonin levels parlay to the

development of brain cancer. DNA damage, immune system abnormalities, oxidant stress and abnormalities in enzymes that help control cell division. Looking at sensitive biomarkers of diseased and pre-diseased states. Will not be ready until probably late 2005 more likely 2006. Dr. Reif's data are sufficiently strong to merit the further investigation and to use care and prudence in making decisions that might result in any increase in the radio frequency radiation exposure to the community.

Data showing RF exposure can lead to loss of reproductive function.

R 11719-Frankel-Irreversible infertility in mice. Danish military personnel exposed to RF emitting radar showing reduced sperm counts. Similar effect in mice and men. So there's a lot of cell animal data showing that low dose RF radiation produces immune system abnormalities. Reduced lymphocyte population in women with residential RF exposure. Folks only one to two percent of the maximum permitted exposure. Folks living on ridgelines near an antenna farm much like these folks here. Lymphocytes-white blood cells that play a critical role in immune surveillance. Go around looking for tumor cells. Lymphocyte studies show profound measurable biological effects are indeed associated with the residential RF exposure. Some neurological and developmental impairment is also associated with RF exposure. School children living in the area of a radio location station had less developed memory and attention, slowed reaction times and decreased neurological endurance. In a second study people who lived and worked near radio antennae and radar installations showed deficits in psychological and short-term memory tests.

R 11720-Frankel-Very real and very concerning body of evidence suggesting that RF radiation at doses within FCC guidelines have biologic significance and serious and harmful consequences. FCC has no health expertise. EPA has no money. Burden of protecting the public health falls to state and local government.

Dr. Cindy Kelly

Resume- R 4958
PowerPoint R 5608-26, 6047

R 11729-Carney-Dr. Cindy Kelley, is an orthopedic surgeon.

KELLEY-Lower doses cause disturbances within the cells causing systems to malfunction.

R 11730-Kelley-Health effects of electromagnetic fields that have been documented are brain cancer, childhood leukemia, birth defects, pregnancy, loss. Study on a physical therapist population where their exposure was between .04 and .56 microwatts per centimeter squared. Sleep disturbances have been documented. Altered calcium ion movement in brain cells causing disturbances in concentration and altered children's performances both mental and physical at levels between zero and .4 microwatts per centimeter square. Plants and animals-distinct growth changes and alteration in cellular enzymes. Both human and animals cells have demonstrated modulation of gene expression, changes in the transcription pattern and protein synthesis. Basically these are DNA effects and alterations in the DNA within the cell. RF radiation should be considered a carcinogenic risk and this was a position taken within the EPA early on in

1990's when there was really actually much less evidence of the potential harmfulness of exposure to EMF radiation. The exposures ranging from .2 microwatts per centimeter squared to 20 mw and then the risk ratio is on the right hand side is the risk of cancer.

R 11731-Kelley-14 times what you would expect. Community levels that are proposed after erection of this tower will be 1 to 20 microwatts per centimeter squared and our population living in the exposed field -3f miscarriage risk, sleep disturbance, children's performances and chronic fatigue is to be reduced, the limits should be even lower .01 microwatts per centimeter squared. Exposure conditions RF signals averages of 5 microwatts per kilogram are capable of inducing chromosome damage and human lymphocytes. Increase in a number of micronucleated cells have been well documented in bio electric magnetic and this is an alteration in the brain. Seeing DNA effects and micronucleated cells which are clearly abnormal. Kids more susceptible. They continue to grow and their cells are being subjected to this radiation over and over causing accumulative, accumulating effects. Surface to body ration, body mass ration is h8igher so they have more skin covering their little weight than we as adults.

R 11732-Kelley-Childhood leukemia and EMF there have been numerous reports with regard to positive association in dose response relationship with relative risk estimates from 1.5 to 2.7 for past exposures. Possible causal nature cannot be dismissed and that was published in the American Journal of Preventive Medicine. Italian study that was just touched on before demonstrated a 2.24 increase in leukemia in children living within six kilometers of Vatican radio and TV transmission towers and in the Australian study you also have an increase in childhood leukemia and death due to TV tower radio frequent exposure. Eighteen studies of childhood cancer and residential exposure to EMF have been conducted and there's preponderance of positive results in more than you would expect by chance. When all these studies are pooled the average list of leukemia, lymphoma which is cancer of the lymph node system and nervous system tumors are statistically significant.

R 11733-Kelley-Current regulatory standards are based solely on the thermal effects of the RF radiation at the cellular level. That exposure as low as two microwatts per centimeter squared may have long-term health effects. Role of EMF as a promoter of malfunction within the cells. One event that causes to develop cancer. DNA mutated and now it's forming a cancer gene as opposed to normal genes in your body and other specific messenger RNA sequences in several types of cells exposed to low frequency magnetic fields. Latency, basically a delayed effect of exposure to a harmful substance, analogy between the sun and UV exposure.

R 11734-Kelley-No link between tobacco use and cancer. I take care of cancer patients day in and day out. Situation a child presented with leukemia living within the proximity to a tower with this kind of EMF I would have to say that there is a direct correlation between these two processes. Risk here is the health hazard to the community both real and perceived versus the benefit, and I put benefit in quotation marks here, for better resolution on the TV screen. The risk of EMF exposure with erection of the new towers is significant and the exposure sufficiently widespread that actions to limit new exposures are warranted.

R 11735-Kelley-Avoiding additional costs and locating the proposed tower to an alternative site that's less inhabited seems to be the most prudent thing to do. This justifies prudent avoidance of unnecessary community exposure. Alarming scientific

evidence linking EMR and the development of cancer and other health problems in children and developed. After exposure to EMR there's significant patterns of increase incidences in childhood leukemia and brain cancer, spontaneous abortion and other harmful effects. Biochemical and physiologic reactions and alterations of the cellular level and tissue level have been documented. Unconscionable that the Jeffco Commissioners would expose an unwilling community of constituents to the effect of EMR until it's unequivocally proven safe.

Dr. Grabowski- MD, MPH

R 11922 –

I'm a physician. I am M.D.,an M.P.H. I've got a masters in public health. I'm board certified in public health and preventative medicine. I currently practice occupational medicine at Boulder Community Hospital...I was in charge of the asbestos medical surveillance...

R 11923 –

...things change over time, understanding changes over time...I started doing some research on this myself and I looked at article, after article, after article that talks about the damage to cells, the damage to gene material, suspicious clusters in cancer and I don't need to go over that...The ethics of this. I think I am old enough to start talking about ethics. I can remember when we x-rayed, how the novelty of x-raying my feet at the shoe store when I was a kid...we have to do no harm...

R 11924 –

...we are setting up an experiment without the express written consent of the experimental subject...They involve likely suffering and possibly death in real people, your constituents, your neighbors, your friends and even family members.

Dr. Hoontrakoon- R 11931.

R 11931 –

allergy and immunology at National Jewish Hospital in Denver...how much of the government has to know before it acts and steps in to protect the public from potential health hazards?

R 11932 –

...in the United States of America you never risk harming innocent children whenever there is ever an alternative available.

Dr. Reif, in charge of the National Institute of Health CSU study on the Lookout Mt Residents, participated in the Lookout Mountain Brain Tumor Audit and warned the BCC about many studies showing correlation between RF and adverse health impacts. **R 2782, 4724, 4941, 6028,**

9139, 12566. See R 4941- Dr. Reif is unaware of any human epidemiological studies of broadcast radiation that do not show a biological effect.

Penny Clarke, Ph.D Biology

R 11866 –

I am Electro Biologist and Health Physician and Assistant Professor of University of Colorado. (Inaudible) at which I work is currently in human trials in the treatment of brain cancer.

The Lake Cedar Group proposal will increase levels of radiation to a large number of homes in this area and the people living in these homes will have a higher risk of associated disease...the significance of this funding. Getting an NIH grant is a big deal and currently only about one in ten grants are funded. Also grants are hypothesis driven which means that CSU has provided sufficient data to convince other scientists that they will see adverse health effects and these effects do have the potential to cause cancer. I would like to remind you of exhibit 70 (**R 2752**-letter from CU Dept of Radiation Oncology Dr.s) from many local experts who are against the new tower.

R 11867

...evidence indicates their fears are justified.

Dr. Mattson , former head of the EPA nonionizing radiation branch

R 11778 – MATTSON: . . . *about 40 years, (next slide), I have been in the radiation standard setting business at the Environmental Protection Agency, at the Atomic Energy Commission and the Nuclear Regulatory Commission...the federal government is not minding the store...government has no entity that will say there are no health (onto 11779) effects from long term low level exposures to non-ionizing radiation.***R 11779 – MATTSON:** *...that in the past five years the environmental Protection Agency has spent a total of \$25,000 in research in this area even though it is the health agency designated to be in charge of protecting people from non-ionizing radiation...no one at the federal level is looking into the effects of long term exposure even though the Federal Communications Commission has called for more research along with EPA, National Institutes of Health, the National Institute of Occupational Safety and Health, the Food and Drug Administration, the National Telecommunication Information Agency, and the National Council on Radiological Protection...are all of the cognitive federal agencies who have called for more research. They did so in 1999 in a letter to the chairmen of the IEEE Committee that writes standards that the FCC endorses. They listed in their letter, in the attachments to their letter dozens of things wrong with the current standard. It's not just that it doesn't address long-term effects and low-level effects, but lots of other things that are wrong with it...because the federal government is not minding the store; the current FCC standards are flawed. There are no standards that address the long*

term low level exposures...A number of other countries have lowered their standards for non-ionizing radiation exposure to the public by significant amounts up to 100 times, a wide variety of countries, Austria, Canada, China, Italy, Russia, and Switzerland. The entire (onto 11780) has a proposal under consideration for lowering by a factor of 100 relative to the United States.

R 11780 – MATTSON: *FCC is ignoring recent research which indicates long term effects of low level exposures....how recent this data, how recent these data are. Most of it, 90% of the data on a low level, long term effects, that data is in papers published since 1990...I have a collection at home that about 60 also so there is a growing international body of scientific evidence that non-ionizing radiation causes health effects...the excess of brain tumors local to the towers. That study is not different than the studies of the public near towers in Italy, Hawaii, Great Britain, Australia. They all indicate adverse health effects due to low-level, long-term exposure to radio frequency radiation...there is a risk that those things will turn out bad because there are potential consequences.*

R 11781 – MATTSON: *...why do we live there if you feel this way about non-ionizing radiation. Most of us moved here before the 1990 or before the results of the post 1990 research were known. You didn't know...the second thing is a number of us made decisions because the zoning up there didn't allow this type of development and of course they're proposing to change the zoning and were counting on you not doing that...Mr. Hart...didn't use the full compliment of eight and it was a close call...in the five areas he analyzed it was higher...you're making us the guinea pigs...It'll come in to Jefferson County and it'll come in the health effects encountered by the people of Jefferson County over the next decade or so. The only evidence available today suggests that those consequences are not pretty (onto 11782). Childhood Leukemia, brain cancer, infertility, altered immune function and neurological development impairment.*

R 11782 – MATTSON: *...we know enough to pinpoint the probable consequences, but we don't know enough to quantify the risk...No federal agency has preempted the setting of public health standards...The standards that exist are flawed. You know there flawed...about ALARA as low as reasonably achievable...Don't let these people hide (onto 11783) behind a flawed federal standard. See also **R 2068, 2760-80, 4188-4204, 4668-70, 5414, 5825, 11778-84.***

PowerPoint-

R 5414-22

MURRY WYNES-Ph.D Immunology

R 11868 –

...our home is at 7,55 feet and is in direct line of site of the towers. We are located southwest of the towers to give you an orientation. We are in block group three of the CSU study which I am sure you have all read. I have a PHD in immunology from CU...credible testimony from both Dr.'s Kelley and Frankel which I completely concur with was done voluntarily and without financial compensation.

R 11869 –

Remember that the towers are at the same elevations as our heads for the people who live on Lookout...If you allow the super tower into the residential neighborhood you will be

potentially denying the citizens the inalienable right of life and denying our right to pursue happiness.

Jim Martin-Electrical Engineer

Testimony

R 11863 –

Testimony presented by his wife, Amy Martin. I would like to discuss the risks of electro magnetic radiation exposure on children. On March 3rd, 2003 the EPA stated that children may be 10 times more vulnerable then adults to cancer risks.

R 11864 – MARTIN:

Children are at risk from high frequency DTV signals than adults because the lower wavelength is closer to their height...The peak absorption for DTV frequencies is at one foot. Because of the children's smaller height their bodies are more often efficient at absorbing the energy from these wavelengths...child at 20 times more risk then adult to radiation from high frequency DTV. Powerpoint used:

R 6083-5

Prof. Maller professor of Pharmacology at the CU medical school...investigator at the Howard Hughes Medical Institute.

R 11820 –*I have over 150 (inaudible) publications in the area of cell cycle in cancer biology...I just want to touch briefly what happens to cells when they are exposed to radiation of various sorts. Basically what causes cancer are defects in the cell cycle. The cycle is when the cells replicate for DNA and segregate its mitosis...what stops cells from cutting out there (onto 11821) properly are breaks in the DNA. And one single break in billions and billions of (inaudible) or DNA is enough to stop the cell (inaudible). And there is quite a bit of evidence that low frequent radiation produced all those (inaudible) breaks. The analogy that I think makes some sense it to think about 10 years ago when we first heard of second hand smoke...It's the leading edge of research in molecular biology of cancer and I think on that basis, you should definitely vote no to the Lake Cedar proposal.*

The following exhibits in the Golden v Jefferson County Commissioners and Lake Cedar Group case document the flaws of using the current RF standard in situations where residents experience long-term exposure:

Record #	White Note book R #	Exhibit #	Type	Description	Date	Author
3424	12544	07	Report and letter	Concerned when RF 2 microwatts per centimeter squared at property line; asserts "prudent avoidance of	9/12/86 4/30/01	Tri-County Health Department-

Record #	White Note book R #	Exhibit #	Type	Description	Date	Author
				risk should be followed”		Adams, Arapaho and Douglas Counties
3431	12551	08	Testimony	Dr. Hoffman-Brain cancer audit showed statistically significant elevations in brain cancer in areas closest to tower; FCC standard is not adequate for protection from long-term RF radiation exposure	6/99	Dr. Hoffman, Chief Medical Officer, Colorado Department of Health
3440	12560	09	Letter	EPA representative-FCC standards not protective from hazards of long-term RF radiation or nonthermal effects; Standards only designed with only short term thermal radiation; “The generalization by many that the guidelines protect human beings from harm by any or all mechanisms is not justified”	3/8/02 7/16/02	Hankin, Norbert, EPA Center for Science and Risk Assessment, Radiation Protection Division; also, Chairman of RFIAGW
3446	12566	11	Press Release	Announcement of 3-year study of health effects of Lookout Mountain residents from RF exposure; Study funded by National Institute of Environmental Health Sciences.; Collaboration with School of Public Health, University of Washington	12/01	Colorado State University, Department of Environmental Health
3459	missing-cover sheet 12578	19	CD	Compilation Buffalo Chips	1998-2000	Carney

1. Sworn Testimony, Exhibits and PowerPoint’s presented in hearings before the Jefferson County Board of County Commissioner in Jeffco Zoning Case #98015154RZP1.
Part of official Record on Appeal in Jeffco District Court Case #99CV2007
LCG LLC (Plaintiff) v. BCC of Jeffco (Defendant)

Record #	Exhibit #	Type	Description	Date	Author	Credentials
2757	70	Letter	University of Colorado Health Sciences Dept. of Radiation Oncology letter “We know of no other instance where a device, chemical or drug ... would be imposed on the public without proof of its safety.... Without proper scientific data, we consider it unconscionable to expose the people of Jefferson County to these levels of radiation.”	March 3, 99	M. Weil, MD D. Raben, MD K Winston, MD N. Foreman, MD L. Glode, MD E. Crawford,	Professors of Radiation Oncology, Medical, Cancer, NeuroSurgery, Pediatric and 2 Oncology nurses

					MD, P. Bunn, MD, C. Finlayson, MD P. Hamilton, RN, B. Andros, RN	
2760	71	Testimony & PowerPoint	FCC limit based on 23 year old research and has many failings	May 27, 1999	Roger Mattson, PhD	Former director of EPA's non-ionizing radiation
2782	72	Testimony & PowerPoint R. 6100-7	Health Effects Associated with Exposure to RF Childhood leukemia Brain Cancer Leukemia Biological effects Brain Cancer Study on Lookout 4 to 5 times more than cancers than expected	May 27, 1999	<u>Dr. Reif</u>	Epidemiologist, CSU Head of Environmental Health, researcher on current National Institute of Health study on Lookout Mountain
2800	73	Testimony R. 6050-8	Health Risks from Electromagnetic Radiation. Brain Cancer, leukemia, birth defects, pregnancy loss, sleep disturbances, alteration in calcium ion movement in brain, altered children's performance, growth changes in cells, over 60 major studies declare dangers	April 27, 1999	Dr. Kelly	Orthopedic Oncologist
2811	74	Testimony(R. 6058-62)	Established association of Leukemia & brain tumor and exposure to electromagnetic radiation. Further study is needed. Do not allow overall increase in RF	April 27, 1999	Dr. Witwer	Radiologist and State Representative
2816	75	PowerPoint & Testimony R. 6091-3	Adverse Biological Effects DNA breakage Can lead to cancer Associated w. neurodegenerative diseases like Alzheimer's, Huntington's and Parkinson's Alters nervous system Increased stress Decreased learning and memory Interacts with some medicines to cause Greater effect.	May 27, 1999	Dr. Lai	Bio-Engineer. Director-Bioelectromagnetics Society. Over 60 published papers
2845	76	PowerPoint & Testimony R. 6094-9	Increased Sensitivity of Eye After treatment with prescription at levels below FCC limits. Damage at less than 200 microwatts per centimeter squared Damage occurred after just 12 hours of exposure	May 27, 1999	Dr. Pardos	Ophthalmologist
2860	77	Testimony R. 6045-50	Scientific literature shows damage from this form of radiation. Swiss study showed sleep disturbances.	April 27, 1999	Paul Polak, MD	Researcher, psychiatry

0	78	Testimony R. 6270-3	Err on the side of caution. Looks like today's standards are much too high	June 29, 1999	<u>Dr. Noufi</u>	Ph.D Physics and Chemistry. Scientist at National Renewable Energy Lab
2876	79	PowerPoint & Testimony R. 6172-5	Review of 22 Studies showed low levels of RF may cause cancer. Other countries allow far less radiation.	May 27, 1999	Shirley Olinger	Nuclear Engineer

CARE July 1, 2003 EXHIBIT INDEX
LCG Zoning Case Number: 02-111694

Record #	CARE Ex #			DATE	Author
4941	90	Letter to County Commissioners	CSU Study of Lookout Mountain – Human Responses to Residential RF Exposure” study	6/18/03	Reif, John S.
4946	92	Letter	MDs & Professors of oncology, Medicine, Gastroenterology, opposition to tower	6/03	Several Including Dr. Michael Glode
4952	96	CV	Stephen K. Frankel, MD Board Certified Internal, Pulmonary, & Critical Care Medicine		
4958	97	Information sheet	Dr. Cindy Kelly Orthopedic Oncologist		
	98	CV	Henry C. Lai, PhD Bioengineering Scientist		
4979	99	Biographical Notes	B. Blake Levitt Science Writer		
	100	Information sheet	Dr. Theodore Litovitz Director of BioElectromagnetics Lab-Catholic U.		
	101	Information sheet	Dr. George Pardos Ophthalmologist		
4981	102	Biographical notes	Cindy Sage Environmental Consultant		
4989	105	Information sheet	Ross M. Wilkins Orthopedic oncology/surgery		
4990-5027	107	Report	Broadcast Radiofrequency Studies Reporting Bioeffects and Adverse Health Effects at Levels Below FCC Standards	6/03	Sage, Cindy
5028	108	Published Paper The Science of the Total Environment	Effects of electromagnetic fields produced by radio television broadcasting stations on the immune system of women	3/1/01	Boscolo, P.
5033	109	Published Paper American Journal of Epidemiology	Cancer Incidence near Radio and Television Transmitters in Great Britain	1/1/97	Dolk, Helen; Shaddick, Gavin; Walls, Peter; Grundy, Chris; Thakrar, Bharat;

					Kleinschmidt, Immo; Elliott, Paul
Health 5042	110	CV	John R. Goldsmith, M.D., M.P.H		
5045	111	International Journal of Occupational & Environmental Health	Epidemiological Evidence of Radiofrequency Radiation (Microwave) Effects on Health in Military, Broadcasting, and Occupational Studies		Goldsmith, John R.
5048	112	Commentary American Journal of Industrial Medicine	TV Broadcast Towers and Cancer: The End of Innocence for Radiofrequency Exposures	1997	Goldsmith, John R.
5062	113	Letter to Editor Reproductive Toxicology	Semen analysis of personnel operating military radar equipment	1997	Hjollund, Niels Henrik I.; Bonde, Jens Peter E.
5063	114	Published Paper MJA	Cancer incidence and mortality and proximity to TV towers	1996	Hocking, Bruce; Gordon, Ian R.; Grain, Heather L; Hatfield, Gifford E.
5068	115	Published Paper The Science of the Total Environment	Motor and psychological functions of school children living in the area of the Skrunda Radio Location Station in Latvia		Kolodynski, A.A.; Kolodynski, V.V.
	116	Book	Electromagnetic Fields A Consumer's Guide to the Issues and How to Protect Ourselves	1995	Levitt, B. Blake
5075	116	Article	Serious Flaws with the FCC Safety Standards		Blake Levitt
5077	117	Power point Presented at 2001 Congressional Staff Briefing-Legislation against FCC Preemption of Local Control	Electromagnetic Fields-Biological Effects-Health Effects		Dr. Litovitz, Theodore
5090	118	Journal of Cellular Biochemistry	Chronic Electromagnetic Field Exposure Decreases HSP70 Levels and Lowers Cytoprotection	2001	Di Carlo, Andrea; White, Nicole; Guo, Fuling; Garrett, Peter; Litovitz, Theodore
	119	Video2001 Congressional Staff Briefing-Legislation against FCC Preemption of Local Control	Electromagnetic Radiation		Litovitz, Ted
5098	120	Power Point Excerpts	Edited by Deb Carney		Lai, Henry
	121	Power point	Biological/Health Effects of Radiofrequency Radiation from Wireless Transmission Towers		Lai, Henry
5141	122	Bioelectromagnetics	RF Radiation—Induced Changes in the Prenatal Development of Mice	1997	Magras, Ioannis N.; Xenos, Thomas D.

	123	Italian Paper	Italian study-cancer near radio tower	1998	Michelozzi
	124	American Journal of Epidemiology	Adult and Childhood Leukemia near a High-Power Radio Station in Rome, Italy	2002	Michelozzi, Paola
5173	125	Letter	Letter to Rick Sheehan		Dr. and State Representative Witwer, John
5174	126	Chart	Negative health effects near broadcast towers		
5176	127	Color Power Points	Massive Tower		Martin, Jim and Carney
4817	128	Affidavit about FCC RF limits	Janet Newton	6/25/03	
4817-4821	128: Att. 1	Challenging FCC RF Limits	Petition for Inquiry of the EMR Network	6/25/01	Hobson, James R.
Staff-fill in	128: Att. 2	Letter-Issues with RF limits	RF Interagency Work Group (EPA, FDA, OSHA, DOC, Occupational Safety, FCC) letter to IEEE-RF Guidelines Issues	6/17/99	Lotz, Gregory W.
Staff-fill in	128: Att. 3	Letter	To Vermont House of Representatives and Central Vermont Regional Development Planning Commission RE: RF Limits	2/11/01	Lai, Henry
Staff-fill in	128: Att. 4	Chart There is no Congressionally funded research at EPA	EPA Budget Summary-\$25,000 for EPA on RF impact to humans	1990-2000	
Staff-fill in	128: Att. 5	Chart	Philips chart comparing RF international limits	June 2000	Philips, Alasdair
Staff-fill in	128: Att. 6	Letter	To James Hobson	12/11/01	Franca, Bruce A.
Staff-fill in	128: Att. 7		Application for Review of Dismissal EMR network	1/10/02	Hobson, James R.
Staff-fill in	128: Att. 8	FCC Website FAQ on RF limits	The FCC is primarily a regulatory agency and is not an expert on matters pertaining to health and safety.	6/1/98	
Staff-fill in	128: Att. 9		35 Studies reporting biological effects of radiofrequency radiation at low intensities	6/4/03	
Staff-fill in	128: Att. 10	Letter-Environmental effects of RF on humans-no Federal agency protecting human health	To Christie Whitman-EPA Administrator	1/31/02	Newton, Janet
Staff-fill in	128: Att. 11	EPA Letter	RF Guidelines do not protect against prolonged exposure	7/16/02	Hankin, Norbert
Staff-fill in	128: Att. 12	EPA Letter	To Janet Newton	3/8/02	Marcinowski, Frank
Staff-fill in	129	Power point Presented at 2001 Congressional Staff Briefing against	Who's in Charge Here? The Fragmented State of RFR Regulation	7/12/01	Hobson, Jim; Lederer, Gerry-attorneys

		FCC Preemption on Tower siting			
Staff- fill in	130	Transparencies	Superimposed proposed tower on existing channel 4 tower: Before and After		Taken from 2/12/03 LCG Color photos “BEFORE” & AFTER
Staff- fill in	134	Power point	Dr. Cindy Kelly	7/1/03	Health- Orthopedic Oncologist
Staff- fill in	135	Power point	Dr. Lai	7/1/03	Bioelectromagne tic Scientist

Recent Research.

Answers to questions of safety regarding human exposure to electromagnetic (EM) fields have become clearer with recent published research. There is no question that living cells react to very low intensities of these fields, including radio frequencies. Stimulation of the stress protein response by RF radiation is a dramatic example of a ubiquitous cellular response to potential harm, and many cellular systems are affected by RF radiation. Furthermore, the responses occur at very low field strengths.

Even though these RF fields are weak from an engineering point of view, recent studies of cellular protective mechanisms triggered by RF fields indicate that it is not prudent to rely on biological safety limits derived by engineering societies. Such RF exposure limits are *many times* above the levels that activate these cellular processes. Other important biological effects resulting from RF radiation exposures well below the IEEE ICES safety standard have been reported in the scientific literature.

Recently Dr. Theodore Litovitz, Director of the BioElectromagnetics Laboratory at Catholic University of America in Washington, D.C. reviewed the published literature on RF radiation exposures below present-day permissible levels and prepared the following presentation on demonstrated biological effects resulting from these exposures for a lecture

entitled, "Biological Effects of Electromagnetic Fields," presented on October 4, 2004, to the board members of the Fairfax County (VA) Council of Parent Teacher Associations (PTAs).

**Biological Effects Induced by RF Radiation
Below Present-Day Permissible Level
(FCC Guideline for Cell Phone RFR of 1.6W/kg)**

Observed Effect	Exposure Level	How Much Below the Standard
Psychological Changes	.03 W/kg	1/50
Immune System Effects	.015 W/kg	1/100
Calcium Efflux Increased	.005 W/kg	1/300
DNA Damage Induced	.0024 W/kg	1/600
Stress Proteins Response	.001 W/kg	1/1600
Blood Brain Barrier Effects	.0004 W/kg	1/4000
Heart Calcium Effects	.00015 W/kg	1/10,600
Increased Cell Proliferation (important in tumor growth)	.000021 W/kg	1/76,000

Dr. Litovitz emphasizes the ability of RF radiation to affect biologic cells through two pathways, i.e., by heating which is associated with the intensity of the RF radiation exposure, and by sending information to the cell, which is associated with RF radiation characteristics such as frequency and modulation and their ability to cause cells to oscillate. FCC's RF safety guidelines do not take these characteristics into account.

Duration of exposure is also central to the cellular effects that will result. Electro-medical RF radiation technologies are being developed which can have beneficial effects when used in precisely measured, low-intensity, targeted, short-term applications. Environmental exposure to these same frequencies that occurs daily or for long durations will be detrimental.

Dr. Litovitz points out that the well-known quotation from Paracelsus in the 16th century applies directly to RF radiation exposure:

Everything is a poison. It is only a question of dose.

The debate over the importance of non-thermal effects from exposure to low-intensity RF radiation continues to be addressed in the scientific journal *Bioelectromagnetics*. It is the official journal of the Bioelectromagnetics Society, which has a central role in scientific study of the interaction of electromagnetic energy with biological systems. The journal is described by its publisher, John Wiley & Sons as:

. . . the official journal of the Bioelectromagnetics Society and the [European Bioelectromagnetics Association](#) and the official Bioelectromagnetics journal of the [Society for Physical Regulation in Biology and Medicine](#). It is a peer-reviewed, internationally circulated scientific journal that specializes in reporting original data on biological effects and applications of electromagnetic fields that range in frequency from zero hertz (static fields) to the terahertz undulations of visible light. Both experimental and clinical data are of interest to the journal's readers as are theoretical papers or reviews that offer novel insights into or criticism of contemporary concepts and theories of field-body interactions.

The "Comment" and "Reply" articles in *Bioelectromagnetics* Volume 25(2004) call into question the biological relevance of FCC's current RF human safety guidelines which are the subject of this rule making.

Comment "A Biological Guide for Electromagnetic Safety: The Stress Response." Blank, M and Goodman, R (2004) *Bioelectromagnetics* 25:642-646.

RF bioeffects researchers, Martin Blank, PhD and Reba Goodman, PhD of Columbia University discuss how the IEEE's approach to RF safety standards development is based on physics rather than biology. They identify the well-studied biological mechanism of stress response, i.e., the protective reaction of living cells to a variety of environmental factors, as an important biomarker of RF exposure. FCC's RF human exposure guidelines are based on IEEE's physics approach, i.e., adverse biological effects are due only to tissue heating. Blank and Goodman's "Comment" article from the scientific journal *Bioelectromagnetics*, Volume 25 (2004) points out that:

Questions of safety of electromagnetic (EM) fields should be based on relevant biological properties, i.e., specific cellular reactions to potentially harmful stimuli. The stress

response is a well-documented protective reaction of plant and animal cells to a variety of environmental threats, and it is stimulated by both ELF and RF EM fields. It involves activation of DNA to initiate synthesis of stress proteins. Thermal and non-thermal stimuli affect different segments of DNA and utilize different biochemical pathways. However, both ELF and RF stimulate the same non-thermal pathway. Since the same biochemical reactions are stimulated in different frequency ranges with very different specific absorption rates (SAR), SAR level is not a valid basis for safety standards. Studies of EM field interactions with DNA and with model systems provide insight into a plausible mechanism that can be effective in ELF and RF ranges.

. . . We feel that recent advances in biology have not been adequately considered in the search for EM safety standards, and that a biological perspective is essential if the process is to be realistic. This paper is a more detailed discussion of the ideas in letters published in the January/February 2004 BEMS Newsletter (Number 176) . . .

The safety problem in a biology context

The EM spectrum is continuous, and its division into frequency ranges, like ELF and RF, is based on physics and engineering criteria related to instrumentation and physical descriptors of the energy, rather than biology. The divisions reflect differences in absorption depth and fractional absorption/reflection of all materials, due to changes in dielectric constant, and are not specifically related to living tissues. The distinction between ionizing and non-ionizing ranges based on chemical reactivity also has limited utility, since the dividing line is within the UV range and chemical reactions are stimulated in ELF and RF ranges. Except for the visible range with its connection to vision, there is no relation between divisions in the EM spectrum and biological properties, and there is no reason to expect responses of living systems to follow the arbitrary classification based on frequency. Despite attempts to alert engineers to developments in biology (e.g., Kasevich, 2003), there is little biological input in formulating the safety problem. As discussed below, new information clarifies the biology of thermal and non-thermal responses, and shows that SAR is not a valid criterion to evaluate biological response.

Thermal and non-thermal responses in biological cells

Living cells have mechanisms to maintain homeostasis (constancy of the internal environment in the face of external changes). The stress response mechanism is activated in reaction to many environmental stimuli, i.e., changes in temperature, pH, osmotic pressure, toxic ions, alcohol, etc. In the classic thermal stress response, originally called 'heat shock', stress proteins (originally 'heat shock proteins') are synthesized via the biochemical heat shock pathway (Lindquist and Craig, 1988). Stress protein synthesis also occurs in the non-thermal response to EM fields (Blank et al, 1994; Goodman et al, 1994; Goodman and Blank, 1998; 2002). The same stress proteins are synthesized in both thermal and non-thermal processes, but via two different biochemical pathways that involve different segments of DNA and that have very different thresholds (Blank et al, 1994; Blank and Goodman, 2000).

An important insight into the EM induced non-thermal response comes from similarities in stress protein synthesis stimulated in ELF and RF frequency ranges (Goodman and Blank, 1998; dePomerai et al, 2000; Kwee et al, 2001; Leszczynski, 2002; Shallom et al, 2002; Weisbrot et al, 2003). The biochemical mechanism activated, the MAPK signaling pathway, is the same non-thermal pathway in both ELF and RF. Several points immediately come to mind:

- *Since quantum energies of EM fields in ELF and RF ranges are very different, the responses must be triggered by a mechanism that does not depend on total energy, or one for which the threshold energy is independent of frequency.*
- *A standard based on biological response should apply in all ranges. Since SAR does not apply for both ELF and RF, it cannot and should not be a criterion for evaluating safety.*
- *The same biological response in ELF and RF ranges suggests that the effects of a wide range of EM field frequencies could be additive and perhaps synergistic. The cumulative effects of all frequencies in the environment and summation in long-term exposures need to be considered in setting safety standards. . .*

The effect of frequency

The fact that the same non-thermal mechanism (and biochemical pathway) is activated in ELF and RF ranges shows that total energy of the field is not critical, but rather the regular oscillations of the stimulating force. The energy associated with each wave (i.e., energy/cycle) is probably more or less independent of the frequency. In the ELF range, a typical frequency is 10^2 cycles/s, and a cycle lasts 10^{-2} s. In the RF range, a typical frequency is 10^9 cycles/s and a cycle lasts 10^{-9} s. If the same energy is needed to reach threshold in RF, the effect in a single cycle must be the same as in ELF. If we assume the energy is approximately proportional to frequency (energy = Planck constant \times frequency), the energy associated with an RF cycle is $\sim 10^7$ fold greater than in the ELF range. Since durations are in the inverse ratio, the energy transferred in each cycle is about the same. (See Table 1.) However, because of many repetitions at the higher frequency, the non-thermal threshold is reached in a shorter time. This should apply until there are interactions with normal vibration frequencies of chemical bonds in the IR [ionizing radiation] range.

The threshold energy/cycle is essentially frequency independent, but total energy absorbed over time (energy/sec in table 1) increases with frequency, and contributes to the thermal process. In the RF range, the EM non-thermal stress response pathway is activated first, and at longer times, the thermal pathway is stimulated due to heating . . .

The stress response in a practical context

The increase in RF broadcasting and communication devices, together with ELF power frequency devices, create an urgent need for realistic safety standards. The stress response is an appropriate biological guideline to evaluate cell safety in both thermal and non-thermal ranges, as well as the effects of long term and complex repeated

exposures. It is also a natural biological bridge to the more complex mechanisms that affect human health . . .

By focusing on biological mechanisms, we have linked thermal and non-thermal effects to a protective cellular mechanism that appears to be independent of frequency over a large part of the spectrum. Further insights should result from utilizing the stress response and specific markers in the biochemical pathway to evaluate effects of complex and repeated exposures. We cannot overemphasize the importance of focusing on biological mechanisms in assessing risk.

Reply - "Reply to 'A Biological Guide for Electromagnetic Safety: The Stress Response' by M. Blank and R. Goodman." Ron Petersen, Chairman, IEEE International Committee on Electromagnetic Safety [ICES], *Bioelectromagnetics* 25:647-648 (2004).

In Petersen's rebuttal of Drs. Blank and Goodman, he notes that:

*. . . more than 30 governments around the world have adopted standards and guidelines based on the following rationale: (1) **the threshold for adverse health effects 4W/kg** based on behavioral work stoppage in laboratory animals, (2) **the only established adverse effects are due to heating caused by absorption of RF energy** and (3) **the data on low-level (non-thermal) effects are inconsistent and not sufficiently developed to be useful in the development of standards to protect human health.***

Petersen states further that Blank and Goodman's position is based on "**un-established research.**" The animal behavioral work stoppage study in laboratory rats to which Mr. Petersen refers is de Lorge, J., and Ezell, C.S., 1980, "Observing-responses of rats exposed to 1.28- and 5.62-GHz microwaves," *Bioelectromagnetics* 1:183-198. De Lorge and Ezell trained rats on an "auditory observing-response task." In the task, an animal was presented with two bars. Pressing the right bar would produce either a low-pitch or a high-pitch tone for half a second. The low-pitch tone signaled an "unrewarded" situation and the animal was expected to do nothing. However, when the high-pitch tone was on, pressing the left bar would produce a food reward. Thus, the task required continuous vigilance in which an animal had to coordinate its motor responses according to the stimulus presented in order to get a reward by choosing between a high pitch or low pitch tone. After learning the task, rats were then irradiated with 1280-MHz or

5620-MHz RFR during performance. Disruption of behavior (i.e., the rats couldn't perform very well) was observed at a SAR of 3.75 W/kg for 1280-MHz and 4.9 W/kg for 5620-MHz.

Disruption occurred within 30-60 minutes of exposure. A replication of this short-term exposure study has not been published.

The same investigators of the above short-term exposure experiments reported two series of experiments in 1986 on the effects of long-term exposure. Here are the results:

- D'Andrea, J.A., DeWitt, J.R., Emmerson, R.Y., Bailey, C., Stensaas, S., and Gandhi, O. P., 1986a, "Intermittent exposure of rats to 2450-MHz microwaves at 2.5 mW/cm²: behavioral and physiological effects," *Bioelectromagnetics* 7:315-328, exposed rats to 2450-MHz RFR for 7 hours a day, 7 days a week for 14 weeks. They reported a disruption of behavior at an SAR of 0.7 W/kg.
- D'Andrea, J.A., DeWitt, J.R., Gandhi, O. P., Stensaas, S., Lords, J.L., and Nielson, H.C., 1986b, "Behavioral and physiological effects of chronic 2450-MHz microwave irradiation of the rat at 0.5 mW/cm²," *Bioelectromagnetics* 7:45-56, also exposed rats to 2450-MHz RFR for 7 hours a day, 7 days a /week, for 90 days at an SAR of 0.14 W/kg and found a small but significant disruption in behavior. The experimenters concluded, "the threshold for behavioral and physiological effects of chronic (*long-term*) RFR exposure in the rat occurs between 0.5 mW/cm² (0.14 W/kg) and 2.5 mW/cm² (0.7 W/kg)."

Thus, RF radiation exposure can produce an effect at much lower intensities after an animal is chronically exposed. This can have very significant implications for people exposed to RF radiation from antenna sites in residential and workplace areas, for example.

The animal behavioral work stoppage study in laboratory monkeys by the same research group is de Lorge, J.O. , 1984, Operant behavior and colonic temperature of *Macaca mulatta* exposed to radiofrequency fields at and above resonant frequencies. *Bioelectromagnetics* 5:233-246. A replication of this short-term exposure study has not been published.

Despite his criticism of Blank's and Goodman's position as representing unestablished science, Petersen does not offer citations for replications of studies which would demonstrate that the behavioral work stoppage in laboratory animals due to heating, the basis of IEEE ICES determination

of adverse health effect level for RF radiation exposure, is "**well-established, consistent, or sufficiently developed**" so as to be useful for the development of standards to protect human health.

In the current FCC rule making for deployment of additional frequencies for consumer broadband access the question of dose must be addressed. To protect the public health, FCC must determine the allowable dose of low-intensity RF radiation to which the public is exposed at these frequencies that will not result in detrimental biologic effects at the cellular level.

Conclusions

1. These studies and publications (and others like them) constitute “significant information relevant to environmental concerns and bearing on the proposed action or its impacts.” 40 C.F.R. § 1502.9(c)(1). Therefore, the FCC must prepare a supplemental EIS for its RF radiation exposure limits.

2. The FCC must take a “hard look” at the scientific data itself and cannot satisfy NEPA’s “hard look” requirement by deferring to RF safety standards that take only an engineering approach to health effects of RF exposure.

CARE proposes that the FCC postpone the implementation of its proposed rules relating to the broadband spectrum for advanced wireless services until the completion and thorough review of the research and studies recommended above and the preparation of an EIS in full compliance with the National Environmental Protections Act.

Deborah Carney
Attorney for:
Canyon Area Residents for the Environment
Carney Law Office
21789 Cabrini Blvd, Golden, Co. 80401
303-526-9666
deb@carneylaw.net